

INFORMATION REPORT INFORMATION REPORT

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REPORT

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"Instructions on Loading and Balancing the Il-18 Aircraft with Four AI-20 Engines - 9G-A A J - For Aircraft with Different Number of Seats and Different Engine Starting Systems - Third Edition", contains the following information:

a. Aircraft Weight Data

- (1) Maximum take-off weight
- (2) Maximum permissible landing weight
- (3) Maximum payload weight

b. Aircraft Equipment

c. Aircraft Balance Data

d. Ferrying the Aircraft

e. Loading the Aircraft

f. Aircraft Interior Layouts

g. Balance Chart

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I N S T R U C T I O N S

ON LOADING AND BALANCING THE M-16 AIRCRAFT

WITH FOUR AM-20 ENGINES

QG - A A J .
—

**For Aircraft with Different Number of Seats and Different
Engine Starting Systems**

Third Edition^{x)}

x) Payload weight limits are not included.

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SECRET**I. AIRCRAFT WEIGHT DATA**

As the Mi-18 aircraft is produced in several seating layouts involving change in number of seats and engine starting systems, the aircraft empty weight and balance data include the weight of the accessories and airborne starting system supplied from ten batteries, the weight of the passenger seats excluded.

The aircraft empty weight (with airborne starting system, without seats) is 31,330 kg.

- NOTES:
1. Tolerance for aircraft empty weight.... +1%
 2. If the aircraft weight empty exceeds the abovementioned value, the tolerance included, then its payload should be diminished accordingly.

A. MAXIMUM TAKE-OFF WEIGHT

The max. take-off weight of the Mi-18 aircraft (for aircraft having twelve-layer tyres) is:

at an airport 61,500 kg.
on a flying line 61,000 kg.

The aircraft is allowed to take-off at its maximum weight provided its payload is determined according to Figures 1 and 2. The payload value is restricted by the maximum permissible landing weight.

B. MAXIMUM PERMISSIBLE LANDING WEIGHT

The maximum permissible landing weight for operational landings is 51,000 kg.

The maximum permissible fuel reserve with the landing weight mentioned is determined from the Table 1 and should not exceed 10,000 kg.

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Regular landings with the fuel reserve exceeding 6,000 kg. are not recommended.

Table 1.

Fuel reserve at aircraft permissible landing weight and at different payload weight

Payload weight (kg.)	Remaining fuel (kg.)	Aircraft permissible landing weight(kg.)	Remarks
13,500	3,940	51,000	Regular landings with fuel reserve exceeding 6,000 kg. are not recommended.
12,000	5,440	51,000	
11,000	6,440	51,000	
10,000	7,440	51,000	
9,000	8,440	51,000	
8,000	9,440	51,000	
7,000	10,000	50,560	
6,000	10,000	49,560	
5,000	10,000	48,560	

The table is intended for Ms-18 aircraft having 34 passenger seats and the airborne starting system supplied from ten batteries.

The aircraft disposable weight includes:

1. Fuel weight
2. Payload weight
3. Equipment weight (see Tables Nos. 4 to 8).
4. Weight of auxiliary equipment.

The weight of auxiliary equipment includes the equipment of the second radio sets:

PCB-70	command radio set		96.5 kg.
PCW-4H	command radio set		43.5 kg.

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Total: 140.0 kg.

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This equipment weight refers to the load of the aircraft having this equipment.

In the basic loading conditions (Table 17) the auxiliary equipment weight is not taken into account. With these radio sets installed, the aircraft weight increases accordingly, and C.G. is shifted 0.1-0.2% M.A.C. forward. This C.G. shifting does not affect the aircraft loading.

The payload includes:

1. Passengers' weight (75 kg. per 1 passenger)
2. Baggage weight
3. Cargo weight
4. Weight of food stored in pantry.

C. MAXIMUM PAYLOAD WEIGHT

The value of the maximum permissible payload depends on the number of seats installed in different versions of aircraft, as well as on the type of the engine starting system used. It is determined from conditions of the fuselage strength, baggage compartment load capacity and aircraft balance data.

The values of maximum payload for different versions of aircraft are given in Table 2.

The flights with maximum payload weight are allowed only at a certain fuel reserve determined by the diagrams (Figures 1 and 2). The value of payload for flying with a greater fuel reserve is determined by the same diagrams.

The max. payload values for 111, 105, 89 and 84-seater versions are determined by Fig. 1; those ones for 73, 78 and 79-seater versions are determined by Fig. 2.

The diagrams are plotted to determine the aircraft max. loading taking into account the baggage accommodated in the wardrobe.

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Strictly prohibited to increase the payload weight or fuel reserve above the values indicated in the diagrams.

The payload value at the aircraft various take-off weight is restricted by the conditions of the aircraft permissible landing weight.

The take-off weight values and the design weight data versus the various flight ranges with the corresponding payloads are given in Table 3. This table is arranged as a typical one for a 84-seater version with two types of engine starting systems (to be supplied from 10 batteries or from 20 ones). As regards the remaining aircraft versions, their take-off weight, when flying over the same ranges, is somewhat lower.

The payload of the aircraft having the airborne starting system supplied from 20 batteries decreases by 300 kg. as compared with the aircraft having the starting system supplied from 10 batteries) for most of the versions; for 73 and 78-seater versions the payload decreases by 600 to 800 kg.

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Maximum Pay Load for Different Versions of Mi-18
Aircraft

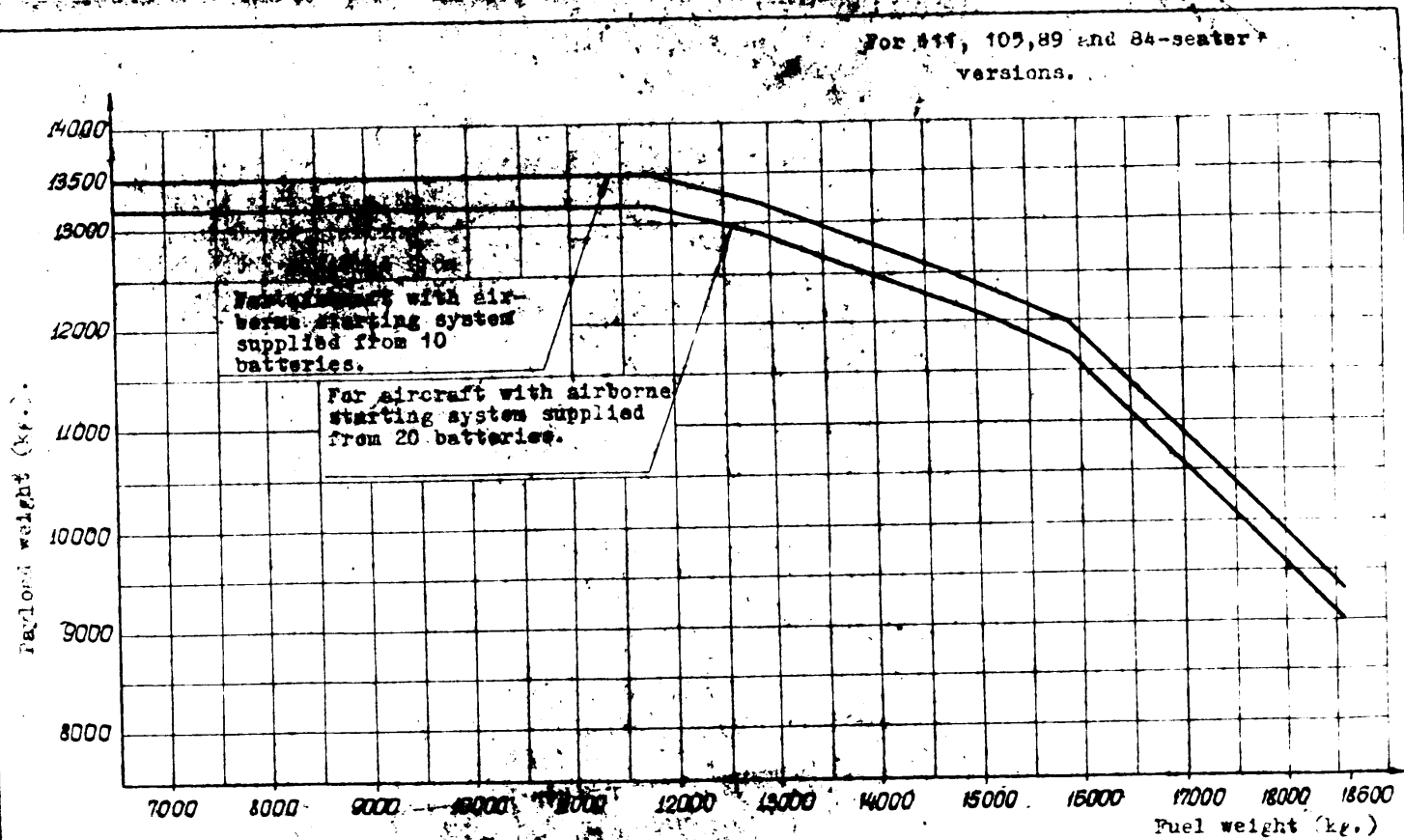
Table 2.

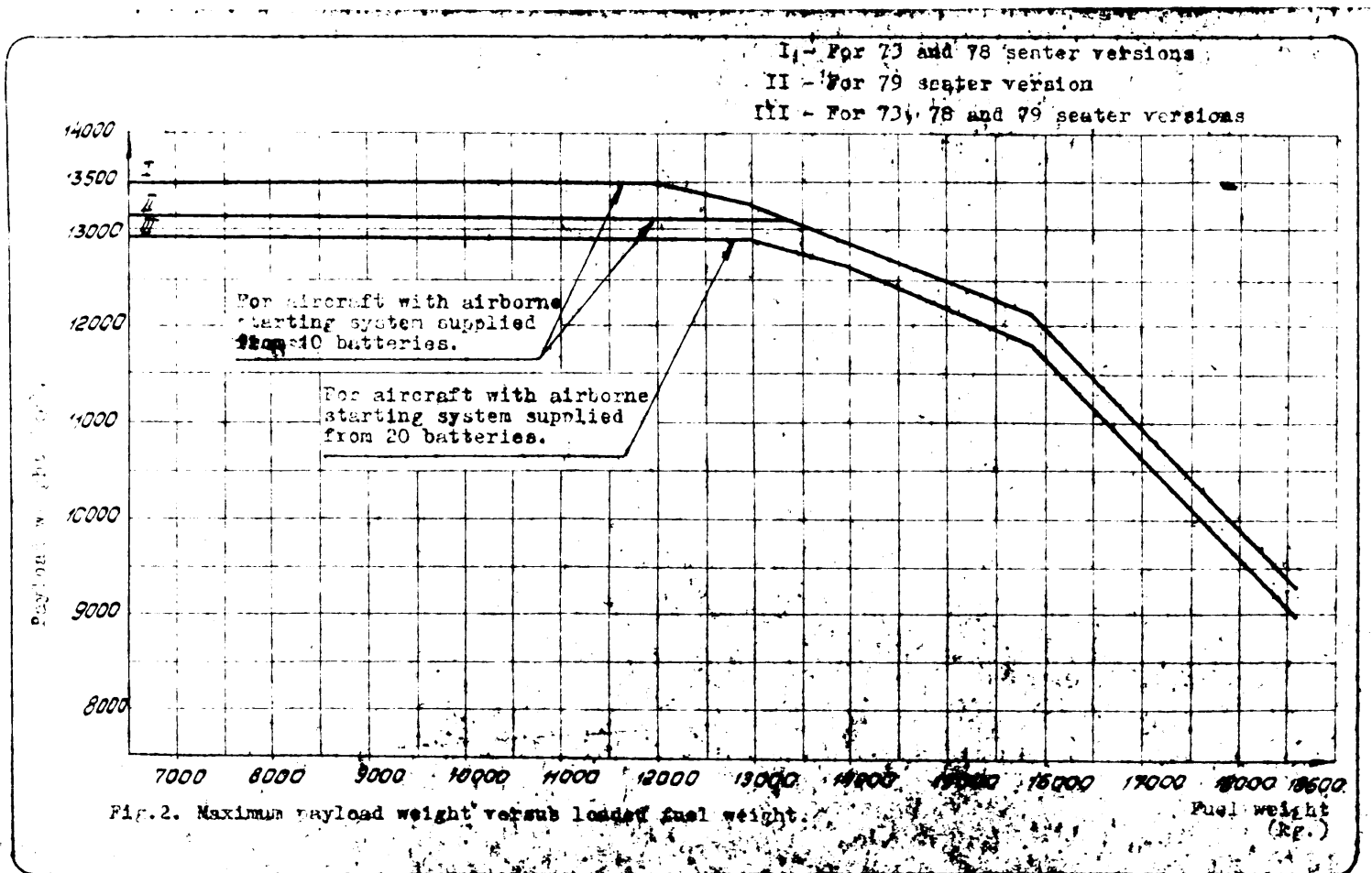
Number of seats in aircraft	Airborne starting system	Without loading wardrobe compartment	With baggage and equipment
III	Supplied from 10 batteries.	13.500	
	Supplied from 20 batteries.	13.200	
I08	Supplied from 10 batteries.	13.500	
	Supplied from 20 batteries.	13.200	
89	Supplied from 10 batteries.	13.300	12.300
	Supplied from 20 batteries.	13.000	12.000
84	Supplied from 10 batteries.	13.200	12.200
	Supplied from 20 batteries.	12.900	11.900
79	Supplied from 10 batteries.	12.900	11.900
	Supplied from 20 batteries.	12.600	11.600
78	Supplied from 10 batteries.	13.000	12.000
	Supplied from 20 batteries.	12.700	11.700
73	Supplied from 10 batteries.	12.800	11.800
	Supplied from 20 batteries.	12.500	11.500

x) Max. pay load of 14,000 kg. is allowed for the aircraft without the airborne starting system.

Table 3.

Weight Data of EM-18 Aircraft powered by AB-20 Engines with AB-68 Propellers (D=4.2 m. 34 passenger seats.)						
Flight range (with 1-hour fuel reserve of 1,800 kg.) at 625 km/hr. cruising speed and altitude of 8000 m. (km.)	1500	2000	2500	3000	4000	5000
Ultimate range to full burn-out of fuel (km.)	2100	2800	3100	3600	4600	5600
T. 2. weight at airport (kg.)	54.960	56.560	58.260	59.560	61.460	61.460
Payload (kg.)	For aircraft with air-borne starting system supplied from 10 batteries.	13.500	13.500	13.500	13.200	12.000
	For aircraft with air-borne starting system supplied from 20 batteries.	13.200	13.200	13.200	12.900	11.700
Fuel (kg.)	7.900	8.500	11.300	12.000	13.900	18.000
Design landing weight with remaining fuel (kg.)	50.360 2500-48%	50.060 2800-48%	50.760 2700-38%	50.960 4200-38%	50.810 5250-38%	49.010 6150-38%
Aircraft design weight with 4,500kg. fuel remained (kg.)	48.500	48.600	48.650	48.360	47.160	44.460
Aircraft weight without fuel (kg.)	47.900	47.800	47.050	46.760	45.560	42.860
Equipped aircraft with 10 batteries						
Empty aircraft with 20 batteries						





II. AIRCRAFT EQUIPMENT

The aircraft equipment depends on the number of seats, pantry dimensions and the type of the engine starting system. In accordance with this the weight of the equipment and its influence on the balance data are determined by the Table 4.

The detail description of one of the aircraft version equipment with a large pantry is given in Tables 5 and 6.

The table contains the equipment data for the 84-seater version. The equipment data for 73, 78, 79 and 105-seater versions differ in the number and weight of seats. Besides that, the equipment for 89 and 111-seater versions differs in the types and weight of the pantry equipment.

The detail equipment data for 89-seater version with a small pantry are given in Tables 7 and 8.

The weights of the seat sets and their C.G. coordinates are given in Table 9 and the starting system weight data are given in Table 10.

Equipment weight (without crew) for aircraft with different number of seats and engine starting systems. Weight in pounds, lb.

Table 4.

Number of seats Start- ing system	111	105	89	84	79	78	73
Per aircraft with airborne engine starting system supplied from 10 batteries.	16400 =+8,2 M.A.C.	<u>1840</u> =+8,8	<u>1830</u> =+2,2	<u>1820</u> =+3,8	<u>1780</u> =+3,2	<u>1810</u> =+8,1	<u>1760</u> =+8,0
Per aircraft with airborne engine starting system supplied from 20 batteries.	<u>1990</u> =+6,2	<u>2190</u> =+7,8	<u>1980</u> =+6,2	<u>2180</u> =+7,3	<u>2130</u> =+7,2	<u>2160</u> =+7,1	<u>2110</u> =+7,0

NOTE: Weight of the starting systems supplied from 10 batteries is included in the empty aircraft weight. For aircraft with the starting system supplied from 20 batteries, the weight of ten extra batteries is included in the weight of the equipment.

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Table 5.

Equipment of Mi-10 4-seater aircraft (having large pantry) engine starting from 10 airborne batteries.					
Pos.	(kg.)	Included	G (kg.)	X(m.)	Y
Oil	320	In tanks In oil coolers In engines, oil units and pipelines	207,4 49,0 68,6	11,650	8728,6
Equipment (total weight of 1,510 kg.)	Seats with tables		830		12635
	Pantry equipment	Containers with dishes and linen - 22 ea. Boxes for second course dishes - 12 ea; ovens - 2 ea; boilers - 9 ea; case.	249,7 49,2 80,0 58,0 5,0	21,675 21,340 21,120 28,000 28,200	5412,2 1049,7 638,6 1219,7 118,0
	Water	In front toilet - I In front toilet II In rear toilet In air conditioning system	29,0 29,0 25,0 65,0	7,200 11,800 27,700 27,265	210,3 327,7 692,5 1772,3
	Domestic and oxygen equipment (detachable)	Carpets (removable) Literature Portable oxygen bottles with 10-21 oxygen regulators Oxygen in portable bottles, oxygen in fixed bottles.	60,2 20,0 27,0 1,8 8,0	14,610 9,225 8,550 8,550 5,500	878,3 114,0 280,0 18,4 16,5
	Service equipment	Airsteps Escape chute	12,0 6,0	8,300 22,800	99,6 138,2
	Auxiliary equipment	Cart for carrying cargo in lower baggage compart- ments. 3R01-39 Signal flares-12 ea.	12,5 2,6	14,920 1,440	186,5 8,7
	Equipment with- out crew.		1830		29544,4
Equipment with crew of 5.			2230		31901,2

NOTE: The weight of accessories and wiring of the engine starting system supplied from 10 batteries is included in the weight of the empty aircraft.

Table 6.

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Equipment of Mi-18 34-seater aircraft (having large pantry) Engine starting from 20 airborne batteries					
Load	(kg.)	Included	(kg.)	X(m)	GX (kg.-m.)
Oil	320	In tanks In oil coolers In engines, oil units and pipelines	207,4 49,0 63,6	11,650	8739,9
Seats with tables	830		830		13630
Pantry equipment	385,9	Containers with fishes and lining Boxes for second course dishes-12 ea; Ovens - 2 ea; Boilers - 9 ea; Case	249,7 49,2 30,0 53,0 5,0	21,675 21,340 21,120 23,004 23,200	5412,2 1049,9 637,6 1219,0 116,0
Water	148	In front toilet I In front toilet II In rear toilet In air conditioning system	29,0 29,0 25,0 65,0	7,250 11,300 27,700 27,365	210,3 327,7 692,5 1772,2
Domestic and oxygen equipment (detachable)	112	Carpets (removable) Literature Portable oxygen bottles with AL-21 oxygen regulators Oxygen in portable bottles Oxygen in fixed bottles	60,2 20,0 27,0 1,8 3,0	14,610 9,225 8,550 8,550 5,500	879,5 184,5 230,9 15,4 16,5
Service equipment	18	Airsteps Escape chute	12,0 6,0	8,300 22,200	99,6 180,2
Auxiliary equipment	15,1	Cart for carrying in lower baggage compartments 3RCM-39 signal flares - 12 ea.	12,5 2,6	14,920 1,410	186,5 2,7
10 extra batteries for eng. start.	350	Batteries - 10 ea Containers - 2 ea with cables.	220 60	25,250	10241,0
Equipment with- out crew	2180		2180		12785,4
Equipment with crew of 5.	2580		2580		13140,9

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Table 7.

Equipment of Ma-18 89-seater aircraft (having small pantry) Engine starting from ten airborne batteries.					
Load	G (kg.)	Included	(kg.)	(m.)	GX (kg-m.)
Oil	320	In tanks In oil coolers In engines, oil units and pipelines	207,4 49 60,6	11,650	3728,0
Seats with tables	880		880		13695,4
Pantry equipment	136,9	Containers with dishes and linen- 22 ea; Boxes for second course dishes-12 ea Ovens - 2 ea; Boilers - 9 ea; Case	86,7 47,2 5	22,500 23,170 23,250	1950,8 1093,7 69,8
Water	148	In front toilet I In front toilet II In rear toilet In air conditioning	29 29 25 65	7,250 11,300 27,700 27,265	210,3 327,7 692,5 1772,2
Domestic and oxygen equipment (detachable)	112	Carpets (removable) Literature Portable oxygen bottles with KII-2I oxygen regulators Oxygen in portable bottles Oxygen in fixed bottles.	60,2 20 27 1,8 3	14,610 9,225 8,550 8,550 5,500	879,5 184,5 230,9 15,4 16,5
Service equipment	18	Airsteps Escape chute	12 3	8,300 22,100	99,6 133,2
Auxiliary equipment	15,1	Cart for carrying cargo in lower baggage compart. Signal flare - 12 ea	12,5 2,5	14,930 1,400	183,5 3,7
Equipment with- out crew	1630		1630		25130,1
Equipment with crew of 5.	2030		2030		27347
NOTE: The weight of accessories and wiring for engine starting system supplied from 1 battery is included in the weight of the engine compartment.					

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Table 1.

Equipment of aircraft having auxiliary power unit Engine starting from 10 lithium batteries					
Load	G (kg)	Included	G (kg.)	(m.)	(kg.-m)
Oil	320	In tanks In oil coolers In engines, oil units and pipelines	207,1 49 50,6	11,650	728,0
Seats with tables	880		830		13695,4
Pantry equipment	136,9	Containers with dishes and linen - 10 ea: Boilers - 8 ea: Case	86,7 47,2 3	22,500 23,170 25,250	1950,8 1093,7 69,8
Water	148	In front toilet I In front toilet II In rear toilet In air conditioning system	29 29 26 65	7,250 11,500 27,700 27,265	210,3 327,7 692,5 1772,2
Domestic and oxygen equipment (detachable)	112	Carpets (removable) Literature Portable oxygen bottles with KIL-21 oxygen regulators Oxygen in portable bottles Oxygen in fixed bottles	60,2 20 27 1,8 3	14,610 9,225 8,550 8,550 5,500	879,5 184,5 230,9 15,4 16,5
Service equipment	18	Airsteps Escape chute	12 6	8,500 22,200	99,6 183,2
Auxiliary equipment	15,1 cargo	Cart for carrying in lower baggage compartments JAGM-39 signal flares - 17 ea.	12,5 2,6	14,920 1,440	186,5 3,7
10 extra batteries for engine starting	350	Batteries - 10 ea Containers - 2 ea with cables	290 60	29,050	10241,0
Equipment with- out crew	1980		1980		35531,2
Equipment with crew of 5.	2360		2360		47888

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Table 10

Number and Weight of Seats					
Versions		Number of seats	G (kg.)	Y (m)	GX (kg.-m.)
Small capacity	High-density seating	111	830	15,585	13868,7
	Tourist	89	830	15,568	13695,4
Large capacity	High-density seating	105	840	15,253	12812,5
	Tourist	84	830	15,220	12633,0
	Tourist	79	780	15,176	11834,9
	Mixed-class	78	810	14,923	12089,7
	Mixed-class	73	760	14,791	11240,8

2) Seat weights include weight of covers, cushions and tables.
(Seats of high-density version are without tables)

Engine Airborne Starting Systems

Table 10

Starting system	xx) Start- ing syst. weight	Weight	Remarks
Starting from external power source (Aircraft fitted with 1500C-45 batteries)	218	-	Cables of 90 kg. included (always in aircraft)
Supplied from ten 12CAM-28 batteries	875	+545	When installing only two containers.
Supplied from 20 12CAM-28 batteries	1023	+895	When installing four containers in aircraft.

xx) Weight of airborne starting system wiring and accessories supplied from 10 batteries is included in aircraft empty weight. Weight of 10 extra batteries with 350 kg. containers for airborne starting system supplied from 20 batteries is included in equipment weight.

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III. AIRCRAFT BALANCE DATA

MA-18 Aircraft C.G. Position Range

The MA-18 aircraft have the following limits of permissible C.G. positions:

Aft C.G. limit 23% M.A.C. (L.G. retracted)

Forward C.G. limit

when landing 16% M.A.C. (L.G. retracted)

Which corresponds to 18% M.A.C. (L.G. extended)

Given in Table 11 is an example of calculating the aircraft take-off and landing C.G. positions for various versions of loading the 84-seater aircraft.

The fuselage nose theoretical outline point lying on the aircraft axis is assumed to be the initial point of coordinates (Fig.3).

To maintain the aircraft balancing within permissible limits when flying without passengers and cargo, load the aircraft with ballast (see section "Perrying the Aircraft").

The influence of fuel consumption on the aircraft C.G. position is shown in Fig.4.

The diagram represents the zone of the aircraft permissible flying C.G. positions versus the fuel reserve.

If during the take-off the aircraft C.G. position is within the zone of permissible C.G. positions (Fig.4), then in flight and when landing the aircraft C.G. position is always within permissible values.

Influence of Passengers' Outer Garments Accommodation in Wardrobes in Winter

When calculating the aircraft C.G. position by the balance chart in winter take into account the weight of the passenger

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outer garments accommodated in front and rear wardrobes. Assume an average weight of one coat equal to 5 kg.

The aircraft has two wardrobes: one - in the cabin front section designed for 95 coats and the other one - in the cabin rear section designed for 16 coats.

The balance chart contains the scales for taking into account the weight of outer garments (or baggage) accommodated in the wardrobes.

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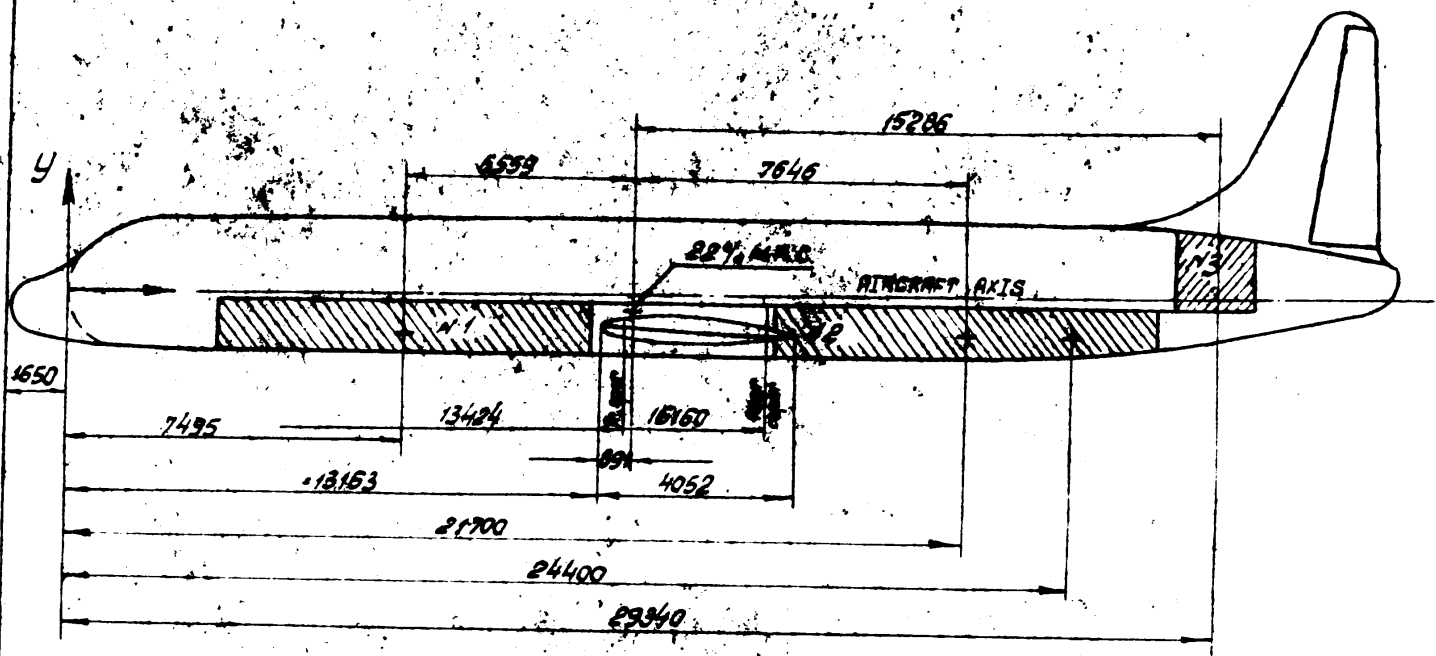
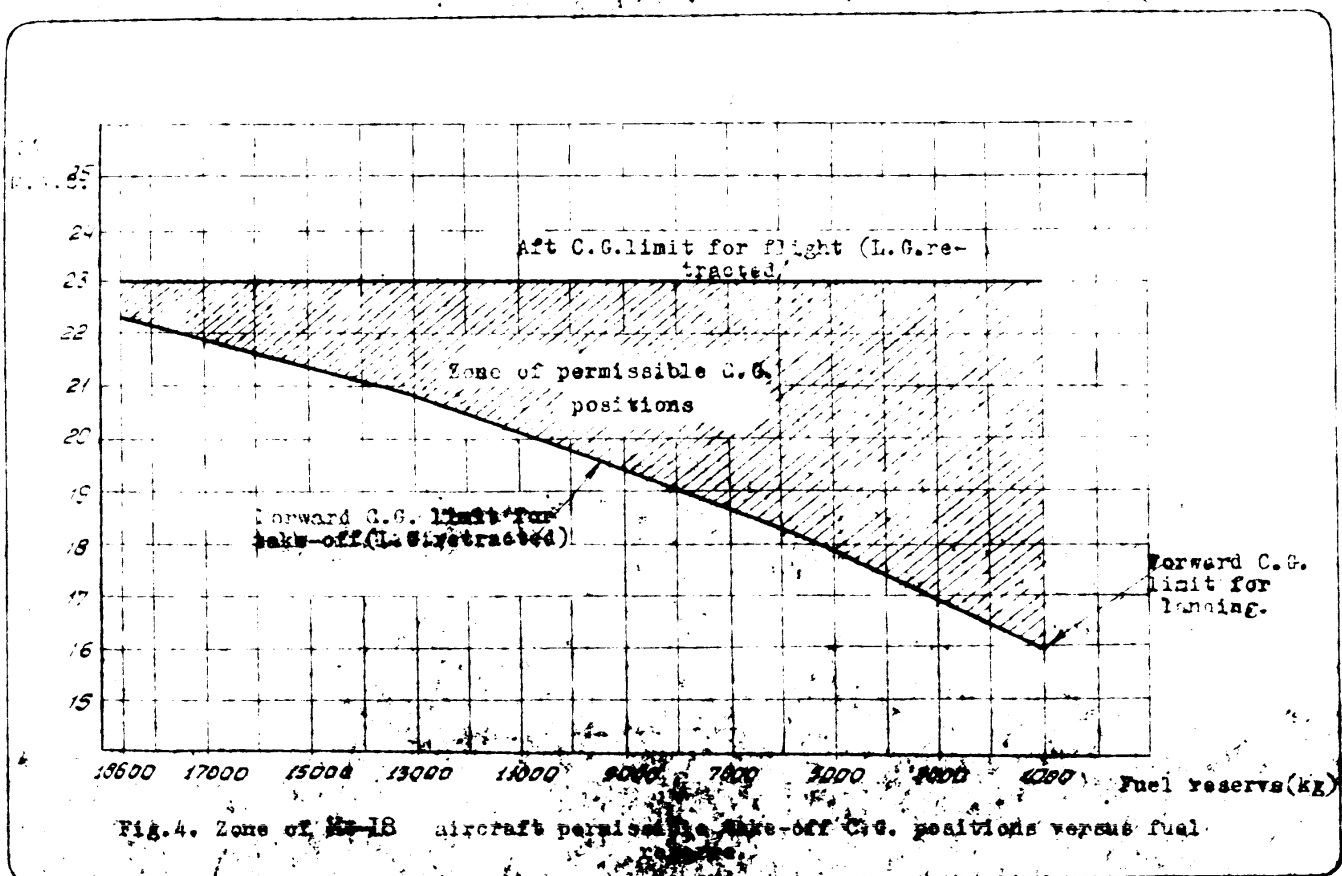
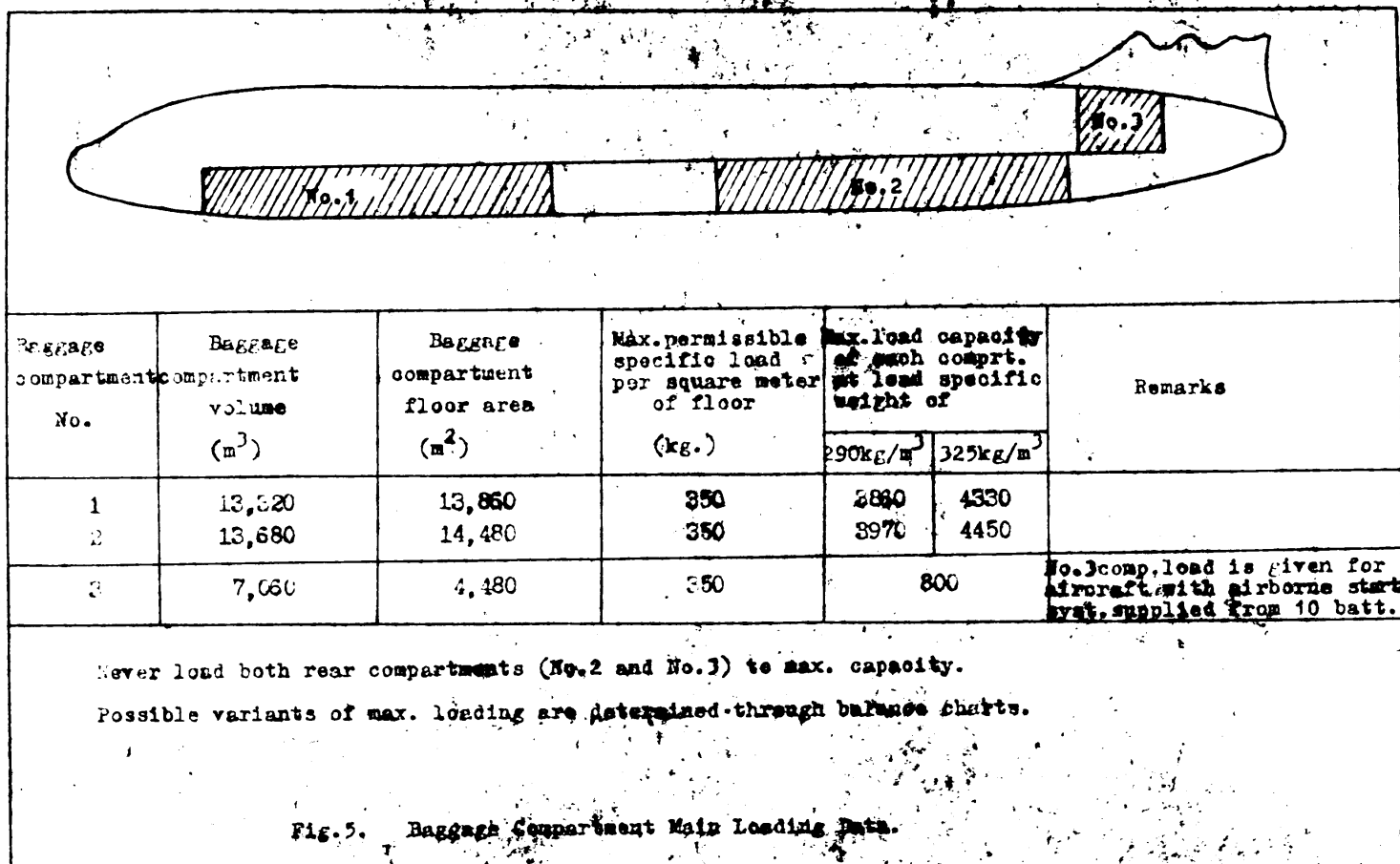


Fig. 3. Aircraft O.S. position diagram.



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C.G. Calculation for MA-18 84-seater Aircraft

Table 1

Engine starting system		Supplied from 10 batteries						Supplied from 20 batteries					
Range km		2500 km 13500 kg			5000 km 9800 kg			2500 km 13200 kg			5000 km 9000 kg		
Description		G, kg	X, m	CX, kg.-m.	G, kg.	X, m.	CX, kg.-m.	G, kg.	X, m.	CX, kg.-m.	G, kg.	X, m.	CX, kg.-m.
Empty aircraft		31380	13,772	429910.8	31380	13,772	429910.8	31380	13,772	429910.8	31380	13,772	429910.8
Equipment		1350		29544.4	1350		29544.4	2130		39785.4	2130		39785.4
Crew (4 members in cabin)		320		542.4	320		542.4	320		542.4	320		542.4
Forward in pantry		90	22,680	1814.4	80	22,680	1814.4	80	22,680	1814.4	80	22,680	1814.4
Fuel		11200	14,713	164785.6	18600	14,706	278582	11200	14,713	164785.6	18600	14,706	278582
Passengers	Number of passengers	84			84			84			84		
	Weight (kg.)	6300		95129.2	6300		95129.2	6300		95129.2	6300		95129.2
	Weight and cargo in baggage compartment	4280	7,495	32458.4	1900	7,495	14240.5	4180	7,495	31829.1	2100	7,495	15789.5
	Weight and cargo in baggage compartment	1910	21,700	41447	900	21,700	19580	2270	21,700	48290	400	21,700	8680
	Weight in baggage compartment	560	29,340	16480.4	-		-	-		-	-		-
	Weight in front baggage compartment	200	9,490	1898	-		-	250	9,490	2372.5	-		-
	Weight in pantry	200	22,295	4459	200	22,295	4459	200	22,295	4459	200	22,295	4459
Total payload		18500		191817	9300		133358.2	13200		192548.4	9000		124067.7
Landed aircraft		58260	/0,835/ 14,048	818414.1	61460	/0,971/ 14,134	868702.2	58310	/0,839/ 14,052	819386.9	61510	/0,974/ 14,137	968592.2
C.G. in M.A.L.	C.G. down		21,8 %			24,0 %			21,9 %			24,0 %	
	C.G. up		20,8 %			22,5 %			20,4 %			22,5 %	
Landing with fuel reserve of 1,300 kg	Weight	48360	/0,758/ 13,921	680106.5	44660	/0,759/ 13,922	621785.2	46910	/0,764/ 13,927	631693.8	44710	/0,768/ 13,926	622628.2
	C.G. in M.A.L.		18,7 %			18,7 %			18,8 %			18,8 %	
	C.G. down												
	C.G. up		16,9 %			16,7 %			17,0 %			16,8 %	
x) One-hour fuel reserve.													

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IV. FERRYING THE AIRCRAFT

When flying without passengers and cargo (when ferrying) the aircraft should be loaded with a securely fastened ballast. The weight of a ballast and place of its accommodation depends on the presence and number of starting batteries in the aircraft and does not depend on the number of seats installed in the aircraft, i.e. for all the main seven interior layouts of 73-, 78-, 79-, 84-, 89-, 103- and 111-seat aircraft the same ballast is taken. The ballast weight is determined by Table 12.

In all events the aircraft C.G. positions are in the following limits:

	L.G. down	L.G. up
Take-off with 18,600 kg. of fuel	25.2±0.3%	23.5±0.3% M.A.C.
Landing with 1,800 kg. of fuel	19.1±0.5%	16.6±0.5% M.A.C.

The G.G. positions are given for flights with the crew of four (without a stewardess) and without food stores in the pantry but with the full equipment according to Table 11.

Taken into account for calculation are:

- aircraft empty weight (with accessories and airborne starting system supplied from 10 batteries and without seats) 31,330 kg.
- empty aircraft C.G. 13.8% M.A.C.

In case of differential data or equipment accommodation the weight of the ballast is calculated by using Balance Charts.

Table 12

Description	For aircraft with eng. start. syst. supplied from 10 batteries.	For aircraft with eng. start. syst. supplied from 20 batteries.
Ballast weight, kg.	550	180
Location	Rear area of baggage compartment No. 2	Rear area of baggage compartment No. 1

Weight and location of ballast required when ferrying the aircraft. Crew of 4.

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V. LOADING THE AIRCRAFT

The Mi-18 aircraft has three baggage compartments. Given in Fig. 5 are their location and enumeration.

The batteries are accommodated in baggage compartment No. 3 of the aircraft with airborne starting system. The useful load capacity of the baggage compartment decreases and with two 10-batteries containers installed it makes up 3.4 m³. Therefore, if necessary, baggage compartment No. 3 may be loaded up to 800 kg. load, (on condition the instructions given on page 22 are observed). When installing 4 containers with 20 batteries do not load baggage compartment No. 3.

When installing 4 containers on the aircraft with airborne starting system supplied from 10 batteries do not use baggage compartment No. 3 for loading.

Given in Fig. 5 is a table with the baggage compartments main data.

Maximum weight capacity of each compartment is determined from conditions of the fuselage total strength, floor strength and baggage compartment volume. The cabin layout and access doors dimensions are given in Figures 6, 7, 8, 9 and 10.

When loading the aircraft its C.G. shifts considerably. Therefore, for each loading condition strictly determine the cargo location in the aircraft and record it in the loading list. The loading list is made in two copies, one of them is left in the aerodrome of departure, the other accompanies the aircraft.

Load the aircraft in the following sequence:

LOAD BAGGAGE COMPARTMENT No. 1 FIRST;

unload baggage compartments Nos. 3 and 2 first.

SECRET

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BAGGAGE AND CARGO ACCOMMODATION

To provide more effective loading of the baggage compartments, and proper balancing of the aircraft, the most part of the passengers' individual baggage and other cargoes having small specific weight are recommended to be loaded in baggage compartment No.2.

Load only part of the baggage in baggage compartment No.1. Fill the vacant part of baggage compartments Nos.1 and 2 with lead. The relation between the baggage and the load is different in each concrete event.

EXAMPLE: With the maximum payload of the aircraft having airborne starting system supplied from 10 batteries the most profitable accommodation (without loading the wardrobe) is as follows:

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Number of seats	Relation between baggage and load in per- cents of sum of load and baggage in each baggage compartment	
	Baggage comp't. No. 1	Baggage comp't. No. 2
	$\frac{\text{Baggage weight}}{\text{Load weight}}$	$\frac{\text{Baggage weight}}{\text{Load weight}}$
III	17/88	100/0
105	13/87	100/0
79	0/100	90/10

PASSENGERS' ACCOMMODATION PROCEDURE IN CASE OF INCOMPLETE NUMBER OF PASSENGERS

Maximum loading of the aircraft baggage compartments is possible only at a certain accommodation of passengers in the cabin.

To provide MAXIMUM LOADING of the aircraft:

1. In case of incomplete number of passengers LEAVE THE REAR ROWS OF SEATS VACANT:

2. If possible, load the front wardrobe with 200 to 250 kg., which increases the total payload weight with small number of passengers by 500 to 700 kg.

The balance calculation data for flying over a distance of 5000 km. (Table 11) refer to the case when the rear rows of seats of the main cabin are left vacant.

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BAGGAGE COMPARTMENTS LOADING REQUIREMENTS

1. Never fly the aircraft with cargoes not attached with mooring cables or without the cargo nets installed in all the compartments. The cargo nets must not be torn and must be secured with all the six spring hooks.

2. A separate cargo with weight exceeding 300 kg. must be moored additionally by cables through the mooring fittings.

3. On loading the baggage compartments and before closing the doors extend the kapron aprons located over them and secure the aprons with belts to the floor.

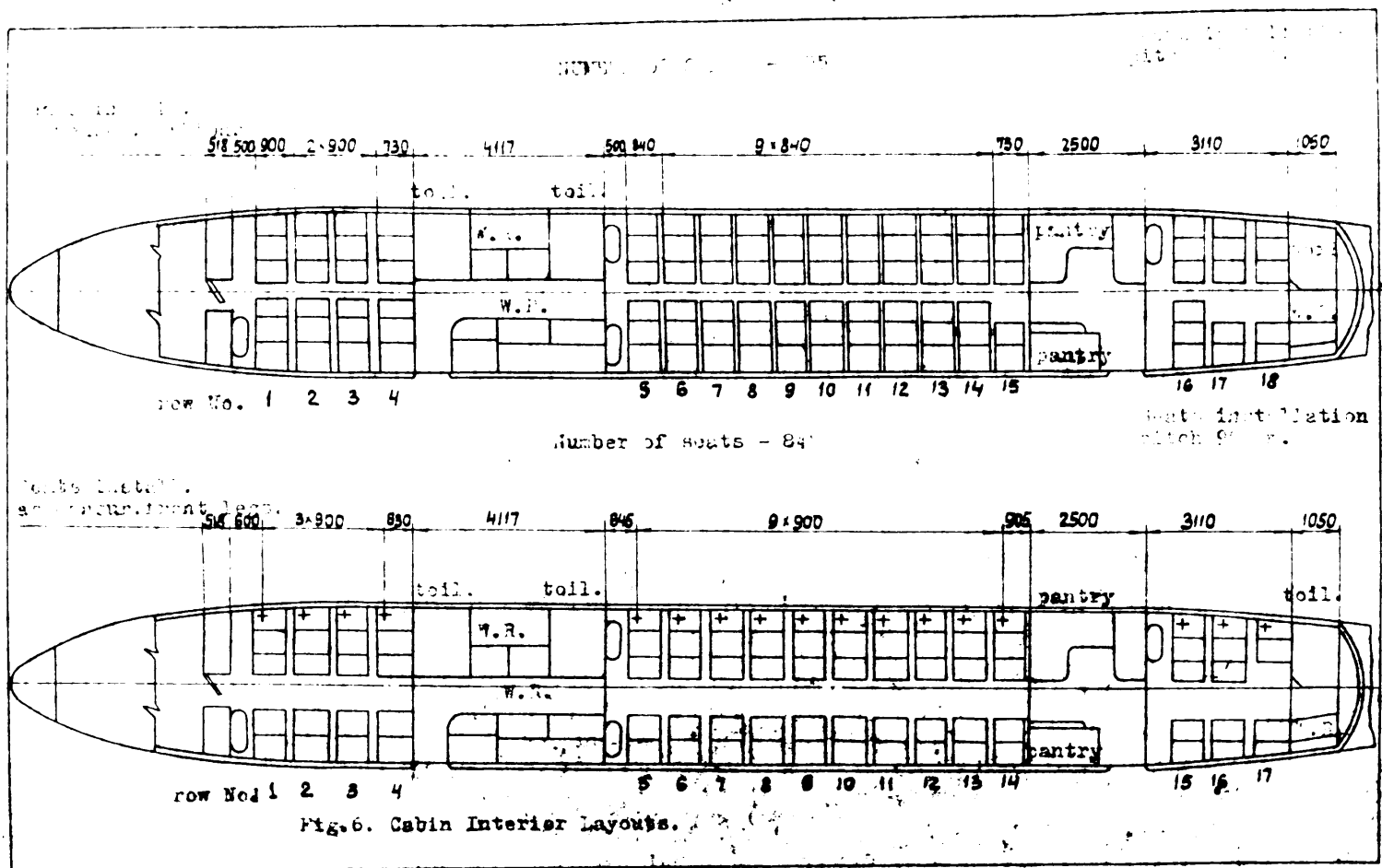
WARNING: Specific load over the baggage compartment floor should not exceed 350 kg./m². In case of heavy cargoes having small dimensions place supports under them.

4. Perform mooring the cargoes in accordance with the instructions.

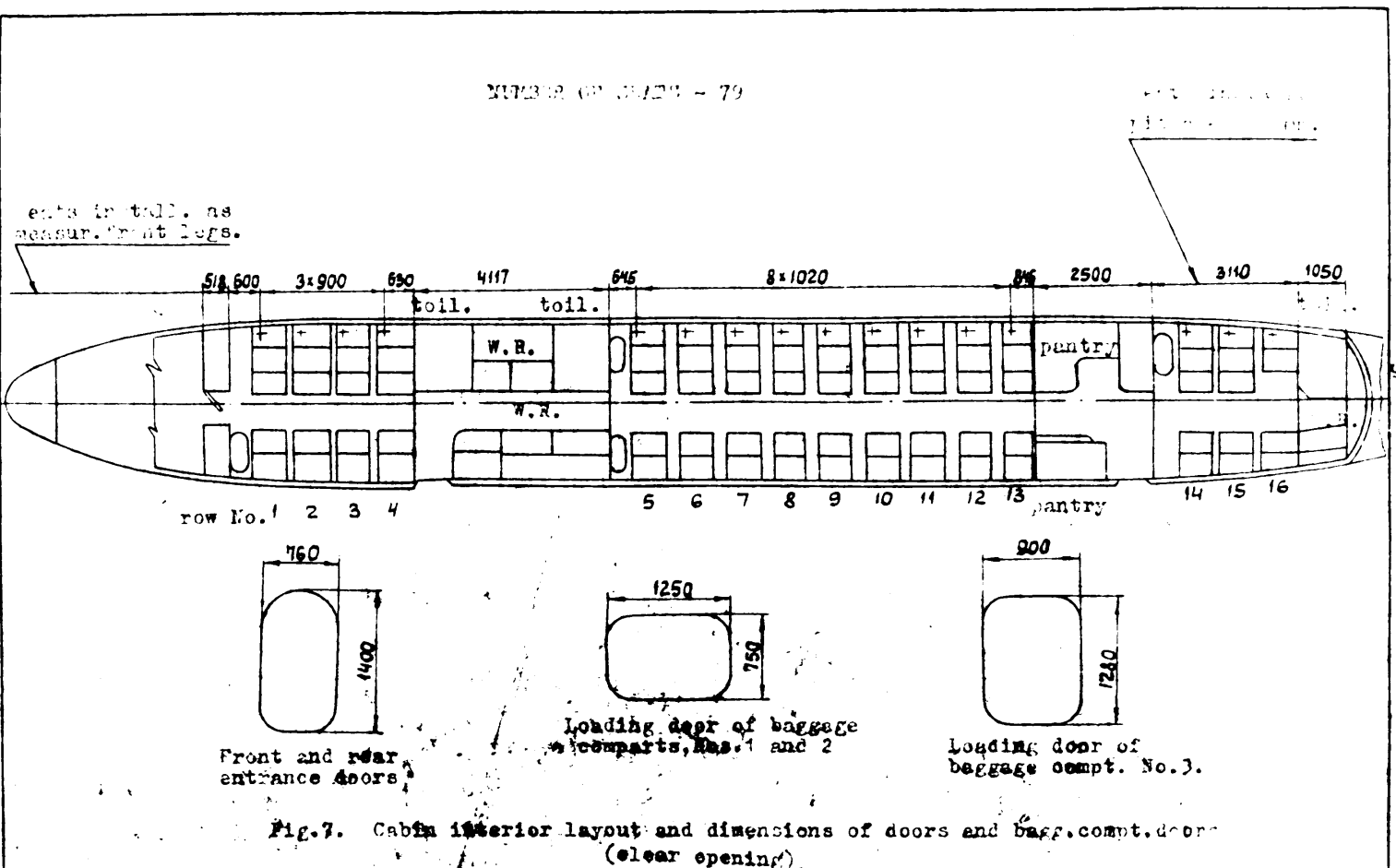
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VI. WJ-18 AIRCRAFT INTERIOR LAYOUTS

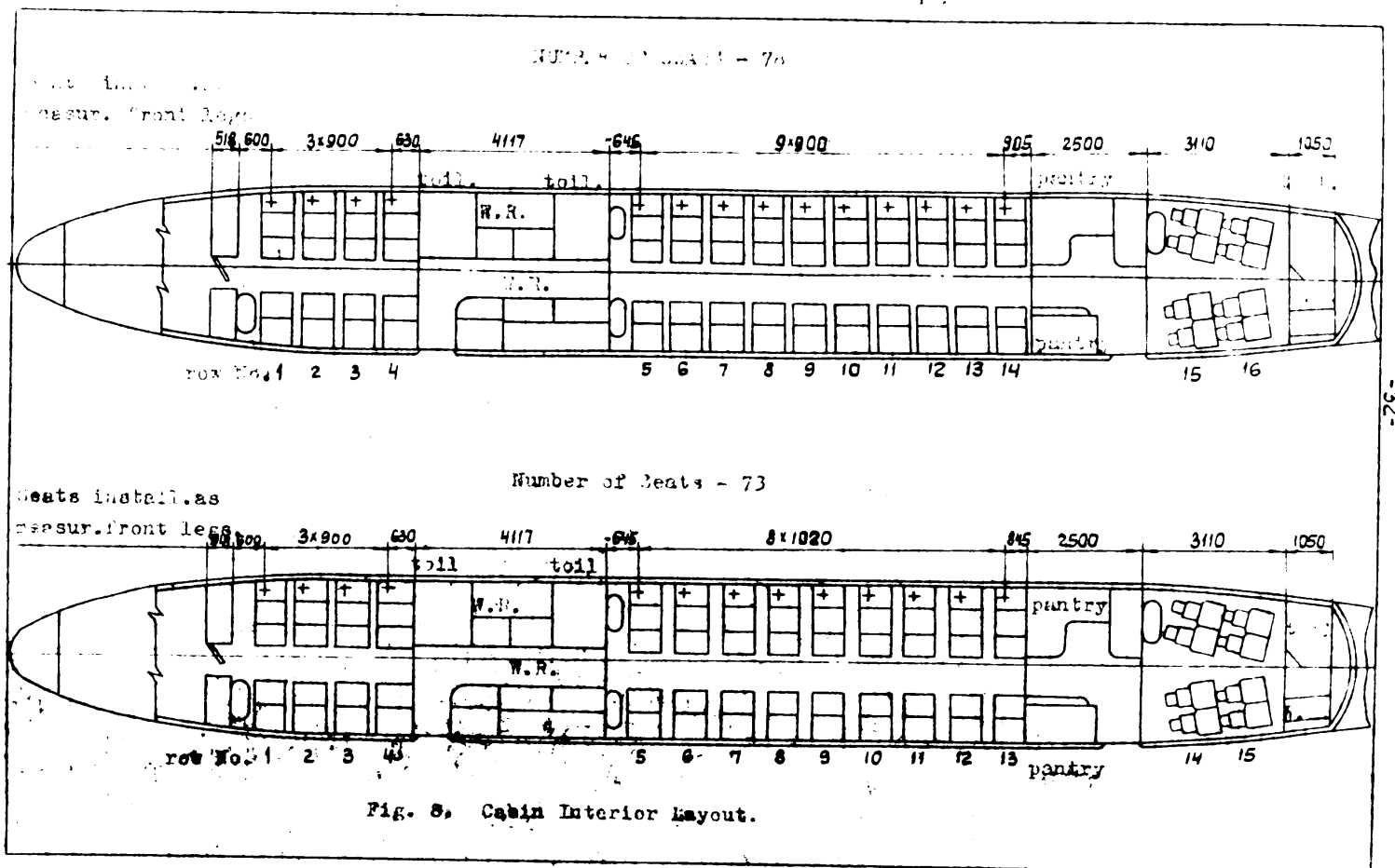
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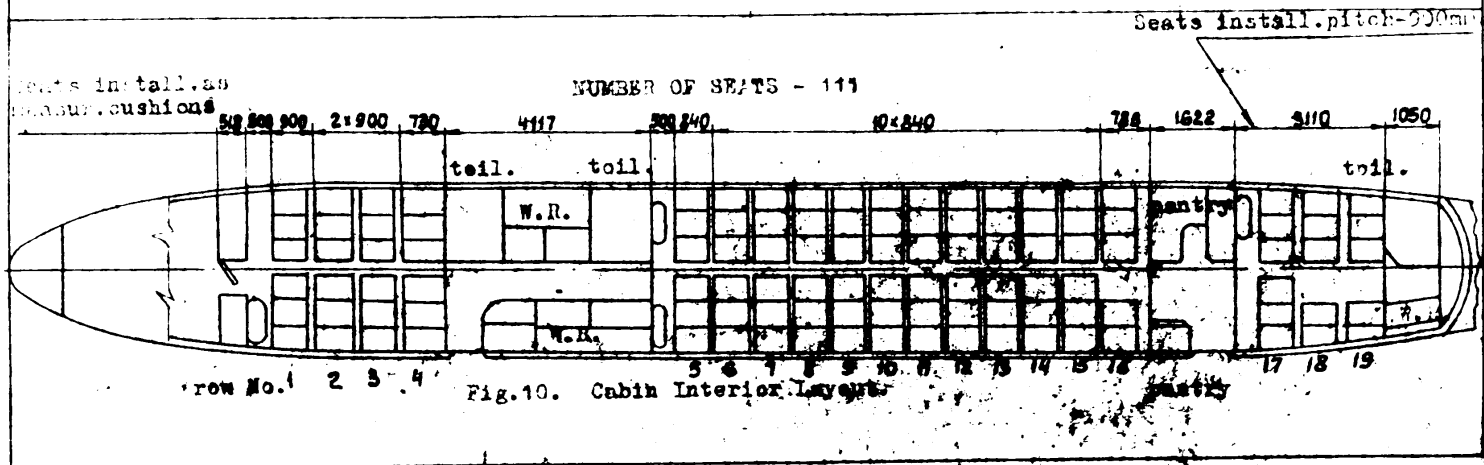
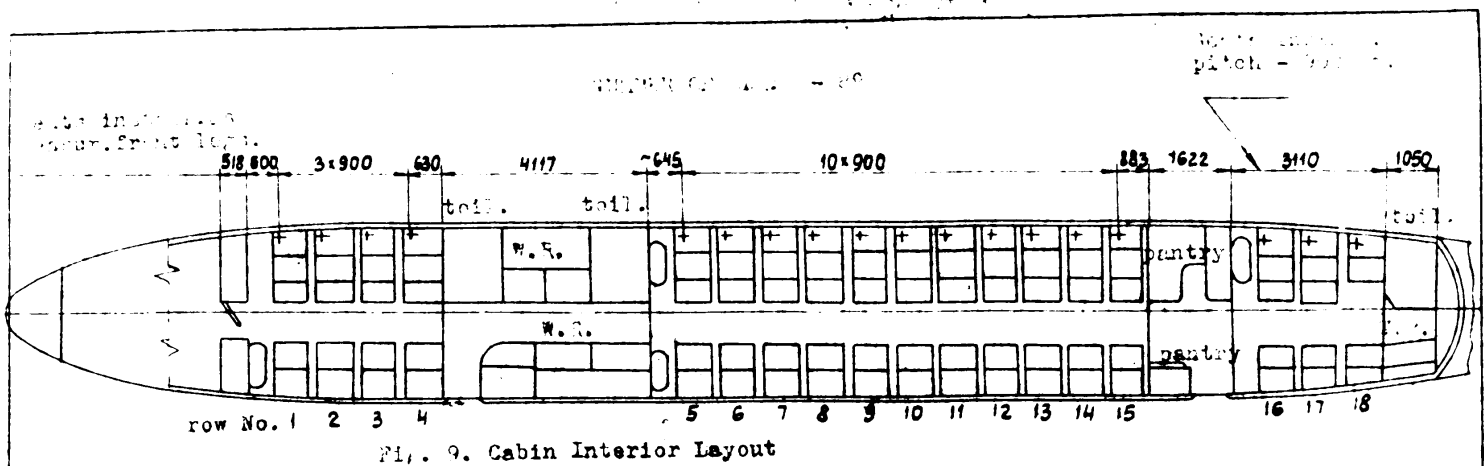
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SECRET



VII. BALANCE CHART

When making calculations by using the balance chart take the weight of the equipped aircraft without the crew and the corresponding aircraft C.G. position with the L.G. retracted as initial data.

THE AIRCRAFT EMPTY WEIGHT AND C.G. POSITION WITH
THE L.G. RETRACTED

(with airborne starting system supplied from 10 batteries without passengers' seats weight which is included in the aircraft equipment weight) are mentioned in the Mfr's aircraft log-book.

THE EMPTY AIRCRAFT C.G. POSITION WITH THE L.G.

RETRACTED shifts forward by 2.9 % M.A.C.
(the equipped aircraft C.G. position - by 2.7 % M.A.C.)

EXAMPLE OF DETERMINING THE WEIGHT AND C.G. POSITION OF THE
EQUIPPED AIRCRAFT WITH THE L.G. RETRACTED

Description	Weight, kg.	C.G. position, % M.A.C.
Empty aircraft, as specified in log book (without seats, with airborne starting system supplied from 10 batteries).	31,330	13.8% L.G. extended
Equipment (without crew, with 84 seats, Table 4)	1,830	+3.3
Influence of L.G. retraction	-	-2.7
Total: Equipped aircraft without crew	33,160	14.4%, L.G. retracted

THE EQUIPPED AIRCRAFT C.G. POSITION WITHOUT THE CREW shifts at 14.4% compared with the empty aircraft C.G. position. Take the equipment weight and the value of the C.G. position shifting from Table 4.

As a result of the calculation performed, determine the aircraft C.G. position WITH THE L.G. RETRACTED FROM THE BALANCE CHART.

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THE AIRCRAFT C.G. POSITION WITH L.G. EXTENSION IS
 DETERMINED BY THE FOLLOWING TABLE:

	Aircraft weight (kg.)					
	61000	55000	50000	45000	40000	32000
Aircraft C.G. position shift due to L.G. extension	+1.5%	+1.6%	+1.8%	+2.0%	+2.8%	+3.8%

If the C.G. position obtained does not meet the requirements, then redistribute the cargoes in the baggage compartments using the Table given in the bottom part of the balance chart.

Given in the Table is variation in the C.G. position at different weights of the aircraft due to redistribution of 100-kg. load among any two baggage compartments.

Therefore, using the Table one can determine the weight of the cargo to be redistributed for changing the C.G. position by the given value.

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C A U T I O N

The K-13 aircraft may be operated with different number of seats.

Given in the present instructions are 6 charts; five of them are intended for determining the C.G. position of the 73, 74, 75, 84 and 90-seater versions; the sixth one is intended for determining the C.G. position of 105 and 111-seater versions.

When determining the C.G. position of the 105-seater aircraft using the sixth chart, do not take into account the 16-th row of the seats (which is absent here), as well as its corresponding scale on the chart.

The charts may be used when determining the C.G. position of the aircraft with different engine starting systems.

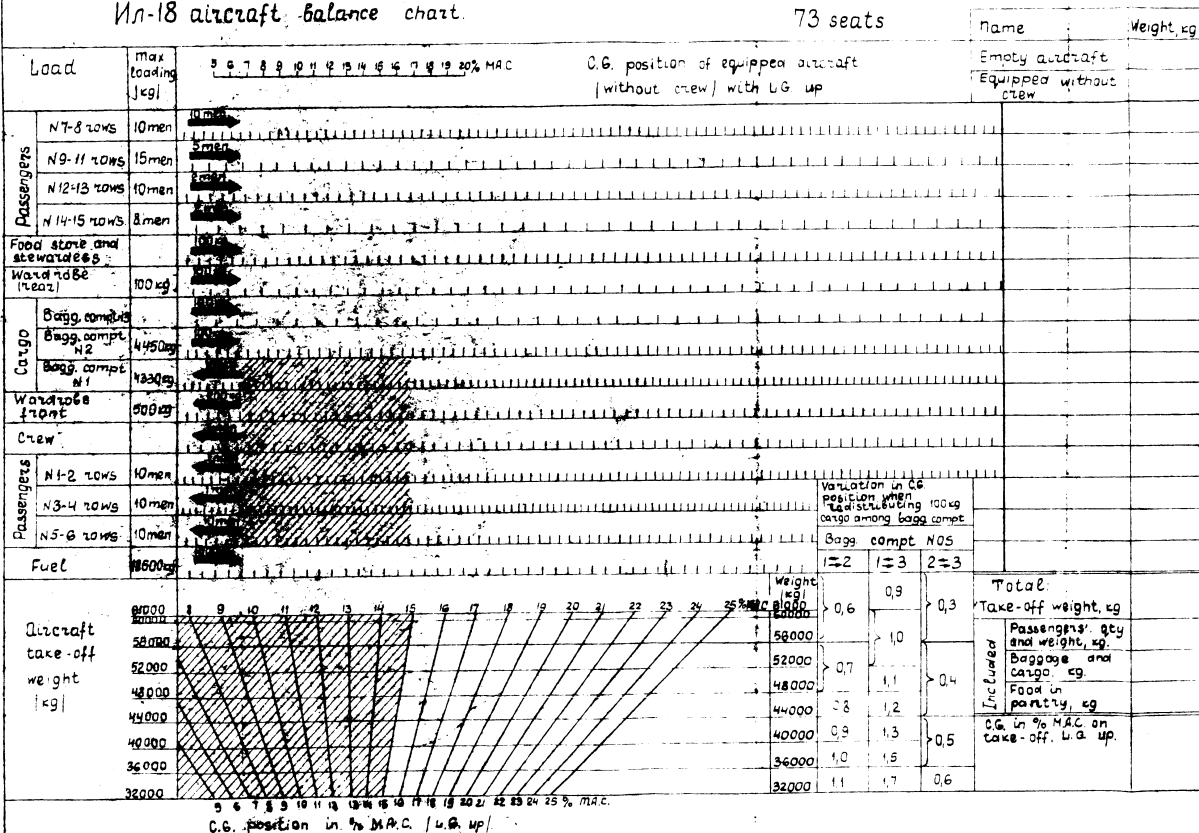
BEFORE DETERMINING THE C.G. POSITION

MAKE SURE:

1. How many seats are installed in the given aircraft.
2. How many batteries are incorporated in the airborne starting system.
3. Whether the empty aircraft weight and C.G. position mentioned in the log-book correspond to the data given in the present instructions.

Ил-18 aircraft balance chart

73 seats

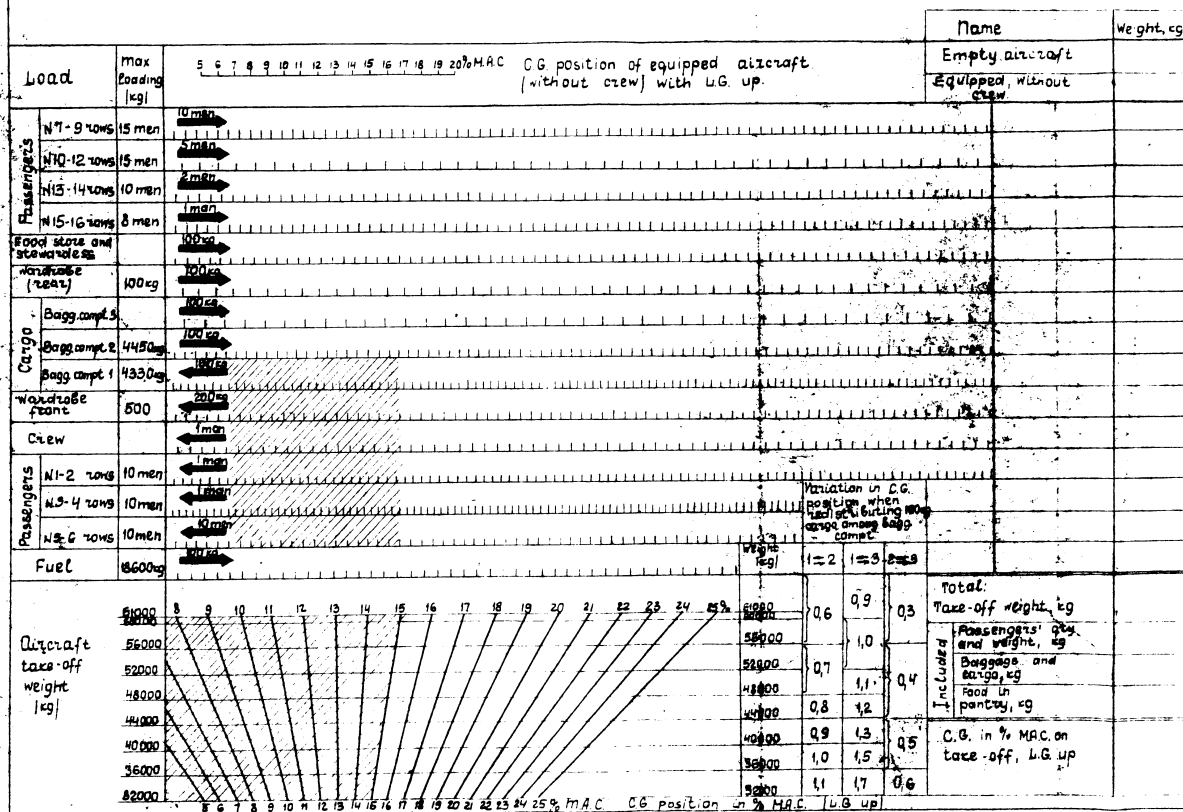


CAUTION:

- Before making calculations, determine the number of seats in the aircraft. This chart is intended for 73-seater aircraft only.
 - The payload weight depends on the flight range and the type of the engine starting system. Max. payload value is determined from Fig. 2.
 - When determining the equipped aircraft initial data, take the empty weight and C.G. position of the aircraft being loaded from its log-book. Take the equipment weight and its influence on the aircraft C.G. position from Table 4.
 - The empty aircraft weight should make up:
 - 31,330 + 300 kg.
 - The empty aircraft C.G. position: 13.8% MAC.
- Should the log-book data differ from the above-mentioned data, check that the equipment corresponds to that included in the aircraft empty weight.

Ил-18 aircraft balance chart

SECRET 78 seats



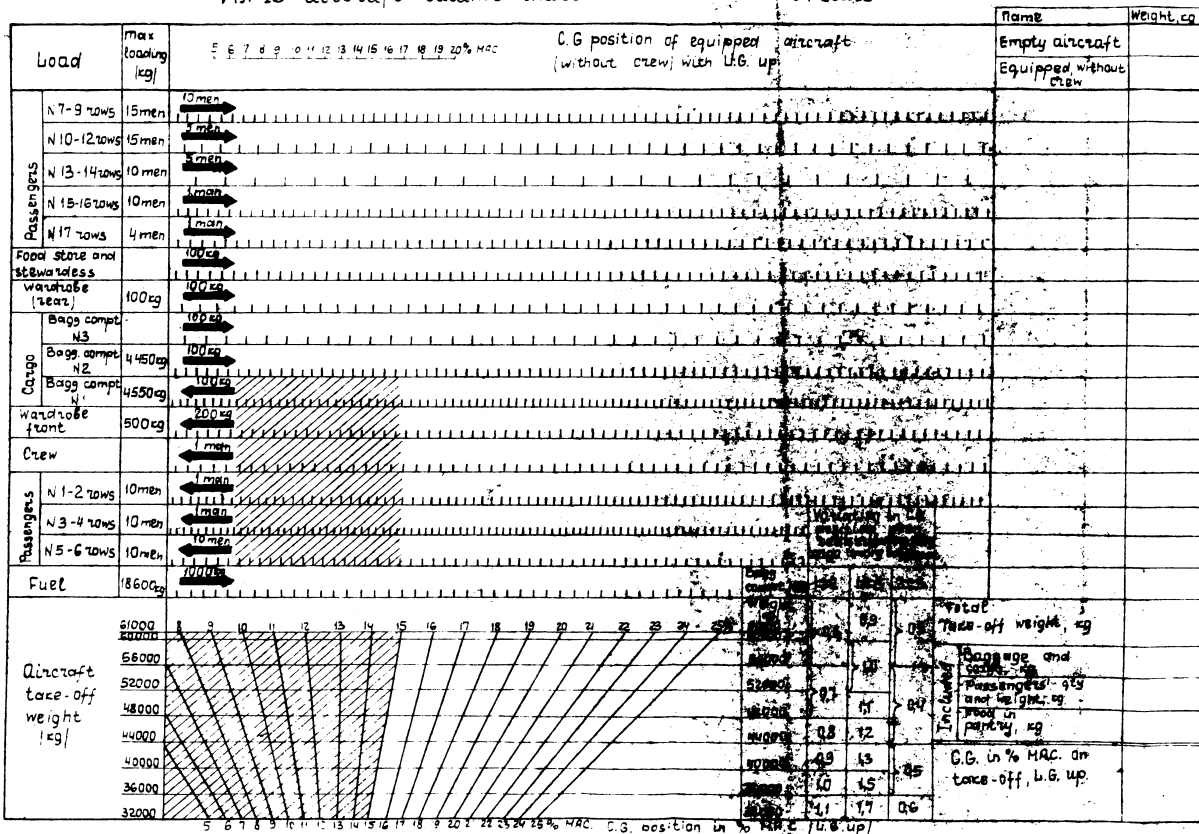
79 seats

1. Before making calculations, determine the number of seats the aircraft will carry. It is intended for 76-seater aircraft only.
2. The payload weight depends on the flight range and the type of the engine starting system. Payload value is determined from Fig.2.
3. When determining the equipped aircraft initial data, take the empty weight and C.G. position of the aircraft being loaded from its log-book. Take the equipment weight and its influence on the aircraft C.G. position from table 4.
4. The empty aircraft weight should make up:
 $31,336 \pm 0.00$ kg.
The empty aircraft C.G. position.
 13.931 ± 0.004 m.
5. Should the log-book data differ from the above-stated ones, check that the equipment corresponds to that included in the aircraft empty weight.

SECRET

Nn-18 aircraft balance chart.

84 seats



ATTENTION:

1. Before making calculations, determine the number of seats in the aircraft. This chart is intended for 84-seater aircraft only.

2. The payload weight depends on the flight range and the type of the engine starting system. Max. payload value is determined from Fig. 2.

3. When determining the equipped aircraft initial data, take the empty weight and C.G. position of the aircraft being loaded from its log-book. Take the equipment weight and its influence on the aircraft C.G. position from table 4.

4. The empty aircraft weight should make up:

31,340 ± 300 kg.

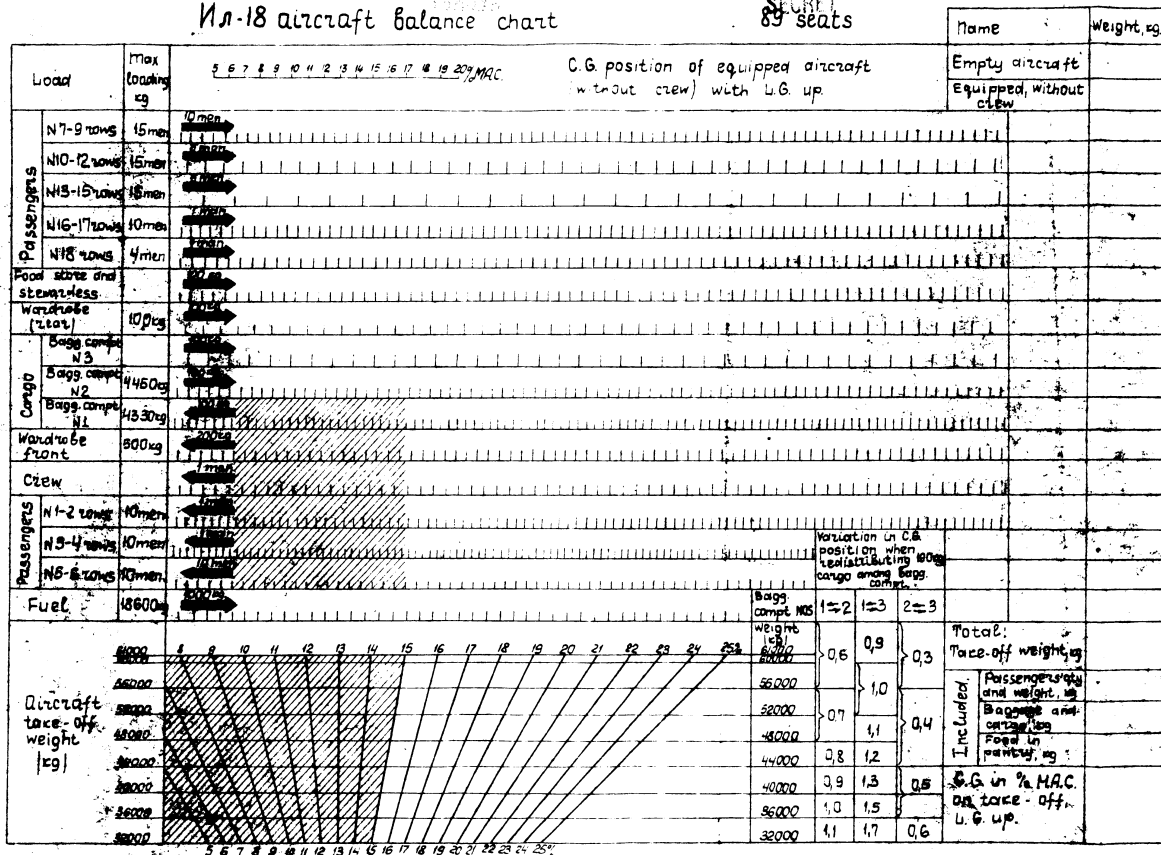
The empty aircraft C.G. position:

13.6% MAC.

Should the log-book data differ from the above-mentioned data, check that the equipment corresponds to that included in the aircraft empty weight.

N-18 aircraft balance chart

89 seats



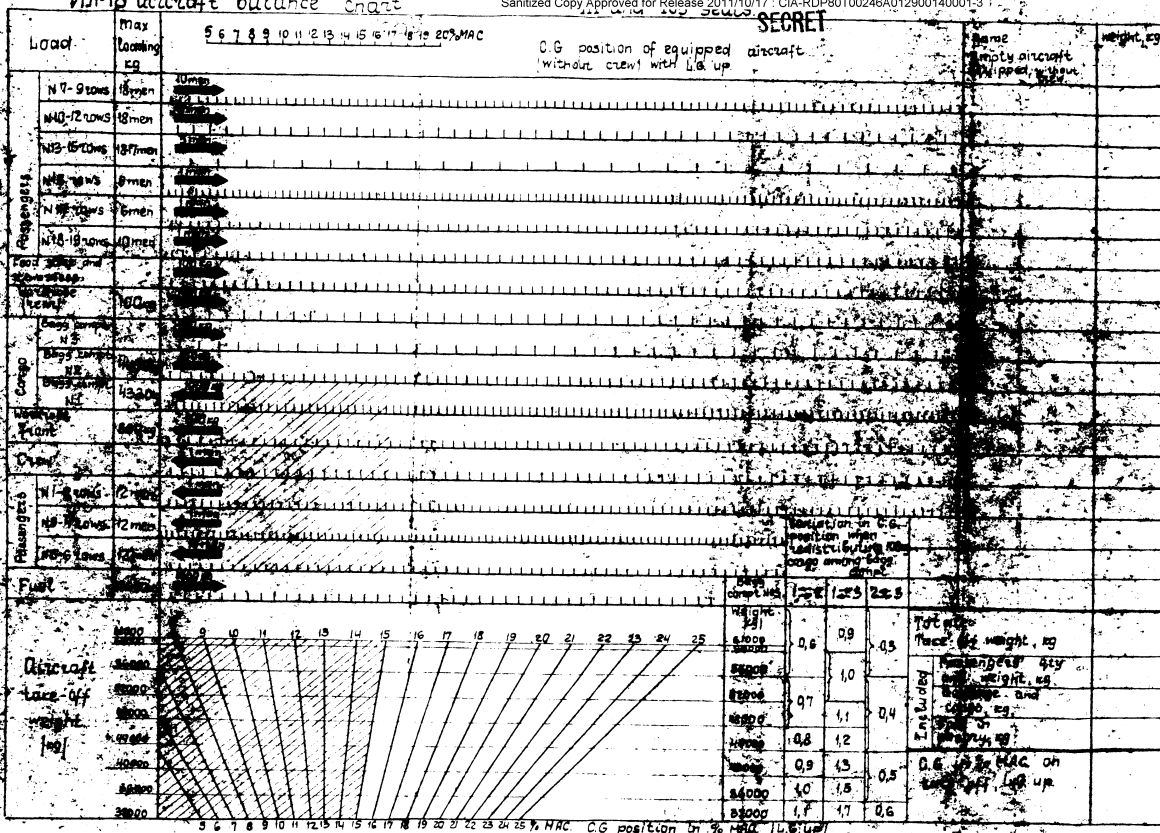
CAUTION:

- Before making calculations, determine the number of seats in the aircraft. This chart is intended for 89-seater aircraft only.
 - The payload weight depends on the flight range and the type of the engine starting system. Max. payload value is determined from Fig. 2.
 - When determining the equipped aircraft initial data, take the empty weight and C.G. position of the aircraft being loaded from its log-book. Take the equipment weight and its influence on the aircraft C.G. position from table 4.
 - The empty aircraft weight should make up: 31,330 kg.
- The empty aircraft C.G. position: 13.8 % M.A.C.

Should the log-book data differ from the above-mentioned data, check that the equipment corresponds to that included in the aircraft empty weight.

U-18 aircraft balance chart

SECRET



CAUTION:

- Before making calculations, determine the number of seats in the aircraft. This chart is intended for 100-1000 seats or aircraft only.
 - The payload weight depends on the flight range and the type of the engine starting system. Max. payload value is determined from Fig. 2.
 - When determining the equipped aircraft initial data, take the empty weight and C.G. position of the aircraft being loaded from its log-book. Take the equipment weight and its influence on the aircraft C.G. position from Table 4.
 - The empty aircraft weight should make up: 10,000-100,000 kg. The empty aircraft C.G. position: 10,000-100,000 % M.A.C.
- Should the log-book data differ from the above-mentioned data, check that the equipment corresponds to that included in the aircraft empty weight.